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REVIEWS

The Evolution of Long Island[1]

The author starts with the ecological viewpoint and endeavors to trace the influence of three principal environmental forces on the history of the island. These are the climate and soil of the island itself, the sea, and the influence of the hinterland or proximity to a large and spreading center of population. In the early history of the island, when the population depended chiefly upon agriculture and fishing, the first two forces were, practically speaking, alone effective. But gradually the influence of the hinterland made itself felt, until recently through improved transportation the population of New York City has extended out onto Long Island for homes, for recreation, and for garden products. Thus the first two forces, though still operative, are now overshadowed by the third.

To the ecologist the chapter on the pine-barrens will be almost the only one of special interest in this rather sketchy and popular account of the history of Long Island. There has been a good deal written on the history of the island in the past, some of which yields valuable information about the early condition of the country. From Thompson, Prime, Furman, Onderdonck, J. T. Adams, the Gardiners, and hosts of others a great amount of information about the early condition of the vegetation on Long Island has been gleaned, to which the present volume appears to add nothing aside from its viewpoint.

More than any of these earlier historians, however, the author of the present volume lays emphasis on the great pitch-pine forests in the center of the island. He shows that just after the Revolution they yielded enough wood to build up a very considerable business in firewood, which continued until the disastrous forest fires, which followed the introduction of the Long Island Railway in 1844, put a stop to these shipments. As a record of facts as to what has been done in the pine-barren area in the way of using them, this chapter is useful. But there is nowhere to be found in it a hint of the significance of those facts in the succession which is being followed out on different sites in the barrens. The author might well have copied the diary of our greatest colonial agriculturist who wrote of this area (22 April, 1790) that it "is too poor to admit inhabitants or cultivation, being a low scrubby oak, not more than two feet high, intermixed with small and ill-thriven pines." General Washington gives us in these few words a better picture of the facts of succession near Coram than this latest addition to the already voluminous history of the island.

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[1] Gabriel, R. H., "The Evolution of Long Island," pp. 1–194, map. Yale University Press, December 31, 1921.

NORMAN TAYLOR

A NEW CLASSIFICATION OF SOIL MOISTURE[1]

One of the most important and unfortunately also one of the most complex ecological problems is that of soil moisture. The time has passed in which data on soil moisture alone were considered of value. We need to know the water available to plants, not merely the total quantity. Pending the formulation of basic physical principles of soil moisture some method must be used for separating the available from the unavailable water. It is now pretty generally recognized that for any given soil the water unavailable to plant roots is a fixed quantity which to all intents and purposes is a constant depending on the physical properties of the soil. This quantity Briggs and Shantz[2] have called the wilting coefficient. The reviewer is not unaware that acceptance of the wilting coefficient is not complete, and that there is still a tendency to consider it correlated with atmospheric conditions as shown by Caldwell[3] and by Shive and Livingston.[4] Yet a mass of data, some published and some unpublished, show that plants wilt when the soil water has been reduced to a certain rather definite point, regardless of the rate of evaporation. It is true that high evaporation to which a plant is not adapted will cause it to wilt while there is still available water in the soil. If the change is sudden enough, a plant can be made to wilt in water culture. Shull's work on the water-withholding power of soils[5] shows that when the water has been reduced to a certain point the force necessary to extract small additional quantities increases very rapidly. The curve of increasing force with decreasing water is very sharp, as shown on page 25 of Shull's paper. Thomas, in a valuable paper on the "Aqueous vapor pressure of soils,"[6] gives curves showing an equally sharp drop in vapor pressure when the soil moisture decreased to a point which corresponded approximately with the wilting co-

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[1] Bouyoucos, George, "A New Classification of the Soil Moisture." Soil Sci., Vol. 11, No. 1, pp. 33–47, 1921.

[2] Briggs, L. J., and Shantz, H. L., "The Wilting Coefficient for Different Plants and Its Indirect Determination." U. S. Dept. Agr., Bur. Plant Industry, Bull. 230, 1912.

[3] Caldwell, J. S., "The Relation of Environmental Conditions to the Phenomenon of Permanent Wilting of Plants." Physiological Researches, Vol. 1, No. 1, pp. 1–56, 1913.

[4] Shive, J. W., and Livingston, B. E., "The Relation of Atmospheric Evaporating Power to Soil Moisture Content at Permanent Wilting in Plants." Plant World, Vol. 17, pp. 81–121, 1914.

[5] Shull, Charles A., "Measurement of Surface Forces in Soils." Bot. Gaz., Vol. 62, No. 1, pp. 1–31, 1916. Reviewed in Journal of Forestry, Vol. 15, No. 1, pp. 110–117, 1917.

[6] Thomas, Moyer D., "Aqueous Vapor Pressure of Soils." Soil Science, Vol. 11, No. 6, pp. 409–434, 1921.